Unit 2 Test Review

Warm Up

1) Simplify then Evaluate

$$\left(\frac{9}{3}\right)^4 - 2^5 \times 2^9 \div 2^6$$

$$3^4 - 2^{14} \div 2^6$$

$$3^4 - 2^8$$

$$81 - 256$$

$$= -175$$

Simplify then Evaluate

$$\frac{(3^2)^6 \times (4^6)^4 \times (3^4)^5 \times (4^2)^7}{(4^3)^5 \times (3^4)^3 \times (4^9)^2 \times (3^2)^6}$$

$$\frac{(3^{12})(3^{20})}{(3^{12})(3^{12})} \times \frac{(4^{24})(4^{14})}{(4^5)(4^{18})}$$

$$\frac{3^{32}}{3^{24}} \times \frac{4^{38}}{4^{33}}$$

$$\boxed{3^8 \times 4^5}$$

$$6561 \times 1024$$

$$= 6\ 718\ 464$$

Test Outline

Unit 2: Powers and the Exponent Laws

Powers

•

$$-5^2, \; (-5)^2 - (-5)^2$$

Base
Exponent
Repeated Multiplication $5^3 =$
The Zero Exponent x^0
Powers of ten
 Expanded form to Standard form and vice versa

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Study Guide

Order of Operations
BEDMAS

Exponent Laws $x^0 = 1$
Product of Powers
Quotient of Powers
Power of a Power
Power of a Product
Power of a Quotient

Exponent Laws

1) Zero Rule

-Anything raised to the exponent of zero is 1

$$(-5)^0 = 1 \quad \text{or} \quad (x)^0 = 1$$

2) Product of Powers Rule

When you multiply like bases you add the exponents

$$(2)^3 \times (2)^5 = (2)^8 \quad \text{or} \quad (a)^m \times (a)^n = (a)^{m+n}$$

3) Quotient Rule

When you divide like bases you Subtract the exponents

$$\frac{(-4)^7}{(-4)^5} = (-4)^2 \quad \text{or} \quad (a)^m : (a)^n = (a)^{m-n}$$

4) Power to a Power Rule

With a power to a power we multiply exponents

$$(2^5)^3 = (2)^{15} \quad \text{or} \quad (a^m)^n = (a)^{mn}$$

5) Power of Product Rule

With a power of products we multiply exponents

$$[(5^5) \times (6^4)]^3 = 5^{15} \times 6^{12}$$

$$\text{or} \quad [(a^m) \times (b^n)]^p = (a)^{mp} \times (b)^{np}$$

6) Power of Quotient Rule

With a power of quotient we multiply exponents

$$\left[\frac{(-3)^6}{(5)^3}\right]^2 = \frac{(-3)^{12}}{(5)^6}$$

Unit 2 Test Review

1)

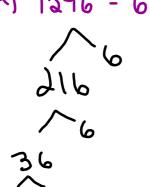Write the BASE and the EXPONENT of these powers:

a) 3^5

Base:

Exponent:

b) $(-2)^8$

Base:

Exponent:

c) -6^7

Base:

Exponent:

2) Write the following as the respecting base:

a) $1296 = 6^?$

216 ⌒ 6

  ⌒ 6

36 ⌒

6   6

6^4

b) $512 = 2^?$

2^9

3)Write the following in standard form

$$(6 \times 10^4) + (7 \times 10^2) + (9 \times 10^5) + (4 \times 10^0)$$

960 704

4) Write the following numbers using powers of 10

530 281

$$(5 \times 10^5) + (3 \times 10^4) + (2 \times 10^2) + (8 \times 10^1)$$
$$+ (1 \times 10^0)$$

Math 9

Date_____ Period

Laws of Exponents

Simplify. Your answer should contain only one base.

1) $\left[2^2 \times \left(2^2\right)^3\right]^2$

2) $\left[6^3 \times 6^3 \times 6^2\right]^2$

3) $5^3 \times 5^2 \times \left(5^0\right)^3$

4) $6 \times \left(6^2\right)^3$

5) $\left(4^3\right)^2 \times 4^2$

6) $6 \times \left(6^3\right)^2$

7) $\dfrac{3^3 \times 3^3}{3^3}$

8) $\dfrac{2^0 \times 2^3}{2^2}$

9) $\dfrac{6 \times 6^2}{6}$

10) $\dfrac{4 \times 4^3}{4^2 \times 4^2}$

11) $\dfrac{6^2 \times 6^0}{6^2}$

12) $\dfrac{3^2}{3 \times 3^0}$

13) $\left(\dfrac{5}{5^3}\right)^3$

14) $\dfrac{6^3}{6^3}$

15) $\left(\dfrac{5^2}{5^3}\right)^0$

16) $\left[\dfrac{4^2}{\left(4^0\right)^2}\right]^3$

17) $\left(\dfrac{4^3}{4^2}\right)^3$

18) $\dfrac{\left(2^3\right)^2}{2}$

19) $\dfrac{\left(3^2\right)^3}{3^2 \times 3^3}$

20) $\dfrac{4^3 \times \left(4^2\right)^2}{4^2}$

21) $\dfrac{\left(2^2\right)^2}{2 \times 2^2}$

22) $\dfrac{\left(5^3 \times 5^2\right)^2}{5}$

23) $\dfrac{6^3 \times \left(6^3\right)^3}{6^0}$

24) $\dfrac{\left[2 \times \left(2^3\right)^0 \times \left(2^3\right)^2\right]^3}{2^0}$

<u>Powers and Exponent laws</u>   ALL QUESTIONS

Simplify each of the following

1) $201^6 \times 201^3$ 2) $9^{18} \div 9^{12}$ 3) $6^8 \times 6^{15} \div 6^7$ 4) $(-7)^{11} \div (-7)^4 \times (-7)^5$

5) $\dfrac{3^{13} \times 3^{11}}{3^{20}}$ 6) $\dfrac{10^{11}}{10^6} \times 10^2$ 7) $2 \times 2^5 \times 2 \times 2^3 + 3^7 \times 3^{11} \div 3^2 \times 3$

For each of the following questions SIMPLIFY then evaluate

1) $7^{12} \times 7 \div 7^9 + 7^4$ 2) $\dfrac{10^{15} \times 10^2}{10^8}$ 3) $3^{27} \div 3^{22} - 3^2 \times 3$

4) $-2^9 \times 2^{11} \div 2^6 - 2^7 + 5$ 5) $4^3 (4^{12} \div 4^7) + 4^2$ 6) $(-5)^9 \div (-5)^6 \times (-5)^1 + (-5)^{10} \div (-5^9)$